

ART. XIII.—*Notes on Victorian Rotifers.*

(With Plates XII and XIII.)

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During the last few months we have been working together on the Rotifera, and as one of us is leaving the colony, we have determined to record the results of our observations somewhat earlier than we otherwise should have done. Of one of the new forms, only a single specimen has been seen, and that by only one of us; but we have recorded this and other observations in the belief that they will be of use to other observers. Mr. Anderson has devoted his attention principally to the Rhizota, Mr. Shephard taking the other orders; but in nearly all cases we have been able to show each other, and to examine together, the various species that we have met with. In the case of new forms, seen by only one, we have indicated the fact by the use of brackets and the initials of the observer; we have not considered it necessary to do this in the case of known forms. We have appended to the names of the species the places where we found them, and what other information we thought might be of scientific interest, but have preferred to err on the side of brevity, rather than to insert unnecessary matter. Our authority throughout has been "Hudson and Gosse," which, with its supplement, is a complete record of all observations up to the date of its publication, three years ago.

ORDER I.—RHIZOTA.

FLOSCULARIADÆ.

Of the Floscularia we have met with :—

(i) *Floscularia coronetta*. In water from the Botanical Gardens, and from a pond near Oakleigh.

(ii) *F. ornata*. Botanical Gardens, Oakleigh, Brighton, &c.

(iii) *F. cornuta*. Botanical Gardens.

(iv) *F. campanulata*. Heidelberg, Brighton.

(v) *F. ambigua*. Oakleigh.

[and a species which I take to be new, and have named

(vi) *F. evansonii*, (n. sp.) It is a small species, much shorter and stouter in proportion to its size than most Floscules. It has five linear, knobbed lobes, in which it resembles *F. coronetta*, but it differs from it in having a broad cylindrical corona with a distinct rim, on which the lobes are inserted at some distance from each other. These lobes are short, less in length than the diameter of the corona, and are very motile, often coming right back till they lie in a plane at right angles with the axis of the body, and they remind one in their movements of the tentacles of the Polyzoa. The corona is broadly barrel-shaped, with a distinct projecting rim, and below it the body again expands somewhat before it tapers to the foot. The breadth of the body is nearly as great as that of the corona, and is one-third of the whole length, while in other species it is usually one-sixth or less. The tube is fluffy and irregular in shape. I found several specimens in water obtained on July 6th, 1891, from a backwater of a stream near Oakleigh. They were $\frac{1}{70}$ th to $\frac{1}{80}$ th in. in length, and were very bold, expanding freely. —H. H. A.]

[(vii) In water obtained from the Botanical Gardens on November 7th, I came across a single specimen of what is apparently a new species of *Stephanoceros*. It had a three-lobed corona, resembling *Floscularia trilobata*, but the setæ on these lobes were arranged as in *Stephanoceros*, i.e., diagonally on the lobes in parallel bands. There were several of these bands round the summits of the lobes, and three or four in the centre of the depressions between them. The cilia of

these bands were in constant motion, creating a strong current of water, which brought particles from a considerable distance. This habit is, I believe, unique among the Flosculariadae, though the one known form of Stephanoceros, *S. eichhornii*, is said to lash with its cilia at an escaping captive, and renders this form peculiarly interesting. I was unfortunately unable to make a careful study of the specimen, and have not since succeeded in finding another. It might be worth the while of other observers to search for this species in the place where I found it. The one specimen was $\frac{1}{20}$ th in. in length.—H. H. A.]

MELICERTADÆ.

The Melicertadæ are well represented in Victorian waters, and not only have we met with many species, but these species were in almost all cases very numerously represented.

(viii) *Melicerta ringens* is common everywhere, and is sometimes very large. We have seen tubes more than $\frac{1}{5}$ th in. in length.

(ix) *Melicerta conifera* is also fairly common, and sometimes most abundant. [I found it in thousands just after the floods in the back waters of Gardiner's Creek at Glenferrie, though a month after I could not find a single specimen there.—H. H. A.]

(x) *Limnias ceratophylli* is common; specimens $\frac{1}{10}$ th in. to $\frac{1}{8}$ th in. seen.

(xi) *Limnias annulatus* is somewhat rare; we have found it at Oakleigh, at Toorak, in a lagoon by the side of the Yarra, and in the Botanical Gardens.

(xii) *Cephalosiphon limnias*. Botanical Gardens.

(xiii) *Æcistes crystallinus*. Toorak, Brighton, Heidelberg.

(xiv) *Æcistes intermedius*. Oakleigh, Botanical Gardens, Heidelberg.

(xv) *Æcistes longicornis*. Botanical Gardens, Oakleigh, Heidelberg.

(xvi) *Lacinularia socialis*. Heidelberg.

(xvii) *Conochilus volvox*. Heidelberg, Melton.

(xviii) *Lacinularia pedunculata*. We found some colonies of this species at Brighton, and examined it carefully, subsequently mounting specimens. To the somewhat meagre description in Hudson and Gosse, we may add the following particulars:—The corona is circular, but for the indentation on the ventral side, which is shallower than in either *Megalotrocha alboflavicans* or *L. socialis*. The ventral antennæ are merely tubercles placed wide apart. The eyes are visible in the adult as very small red specks; they are seen with difficulty in living specimens, but are plainly visible in some of the mounted ones. One of the colonies was an old one, only a few adults were present, but it was full of eggs, and as we watched it, many of them hatched out. Some of them swam for some time with the foot still recurved on the body, but their motions were so active that we were unable to examine them closely. Attached to the weed close to the base of the large colony, was a small one, having a peduncle of the normal type, though very short, but the animals composing it were widely different from the full grown specimens. They had, however, a certain resemblance to the young ones just hatched from the eggs of the old colony. Unfortunately, we were unable to examine them carefully that evening, and they were all dead the next day. Since writing the above, Mr. Shephard has received from Mr. Whitelegge tracings of his drawings of *L. pedunculata*, and in these, one antenna is shown of the character that we have described above. Specimens have also been found by Messrs. Mann and Shephard at Heidelberg, but apparently the species is not common.

We have also met with some species which we take to be new.

(xix) *Æcistes wilsonii*. We found this form in water collected at Brighton Beach in July. It approaches *Æ. crystallinus*, but differs from it in the form of the body when fully expanded, and in the tube, which is gelatinous, clear and rounded, not fluffy and irregular. The corona is indistinctly two-lobed, nearly three times as broad as the body, dorsal gap minute, and the muscular thickenings of the corona more pointed than in the other *Æcistes* which we have seen. The antennæ are set flush on the body, so that

in the retractile state the setæ seem to spring from the body itself; but when the animal expands, that part of the body on which the setæ are situated becomes inflated, so as to form two projecting rounded cones on each side. These cones are placed some distance apart, and in ventral aspect their appearance is very characteristic, the body sloping outwards to their summits till it is half as broad again as it is at their base. When seen somewhat sideways, the anterior slope to the neck is very abrupt, and makes almost a right angle with the axis of the body. When recurved, the sides of the body are drawn back in a deep fold over the wrinkled foot, encircling it, till the bottom of the intestine touches the top of the foot. We observed three vibratile tags in each lobe of the corona, one on each side of the neck, and one in the body near the lower end of the stomach. Two red eyes were clearly seen in young nearly ready for hatching in the eggs. When first seen, the whole body was covered with a layer of gelatinous material, but in a specimen kept alive on a slide for a couple of days, this layer disappeared. Unlike most *Æcistes*, it attaches itself to its tube rather than to the plant on which the tube is fixed, resembling *Floscularia calva* in this respect. It sways itself from side to side, curving right over the edge of its tube.

Sp. ch. Corona indistinctly two-lobed, ventral antennæ placed on the surface of the body wide apart, the body when expanded projecting upwards and outwards to their point of insertion in two rounded cones. Tube gelatinous, rounded; length, $\frac{1}{75}$ th in.

(xx) *Lacinularia reticulata*. This species has at first sight a considerable resemblance to *L. socialis*, but a more careful examination brings out points of difference important enough, we think, to prove it a new species. It is found in small colonies, often of only two or three specimens; the largest we have seen was composed of a dozen. In internal structure, it conforms to the usual type of Melicertadæ. Its distinctive features are a heart-shaped corona, as broad as long, and as broad half-way down as it is at its ventral end, giving it a somewhat rectangular appearance. This rectangular appearance is clearly shown in some specimens we mounted. The dorsal gap in the corona is comparatively large, and easily seen. But the most important point of difference between this and the other species of *Lacinularia* is the presence of antennæ, both dorsal and ventral. The dorsal antenna is

small, not to be seen when the creature is fully expanded, nor when fully retracted, but when partially expanded it may often be easily observed. It appears clearly in some of our mounted specimens. The ventral antennæ are peculiar in their position. They are papillæ, situated some distance below the neck on the body of the animalcule. When it is fully retracted, they are situated at its anterior extremity, and they too may be clearly seen in the mounted specimens. At their bases are two large pear-shaped masses of nerve matter (ganglia?) connected with the nerve cord. As *L. socialis* has been most carefully examined by Huxley and others, it is impossible that the antennæ should have been overlooked had they been present in that form, and had they held the same relation to the nervous system that they do in the one we are describing. In the mounted specimens we noticed, too, that the corona appears beautifully reticulated on its under surface, and we subsequently observed it in living specimens. We found this species in large numbers at Brighton Beach.

Sp. cl. Corona broadly heart-shaped; dorsal gap comparatively large; dorsal antenna minute; ventral antennæ papillæ, situated half-way down the body, and wide apart, connected with pear-shaped nerve masses. Length $\frac{1}{25}$ th in.

(xxi) *Limnias granulatus* (?). In water taken from the Botanical Gardens on November 8, we found a species which may be this. The tube was yellow, strewed with roundish brown granules, and transversely striated on the inside. But though there were numerous old tubes, there were only two with occupants. In these we observed that the two lobes were not nearly so greatly divided ventrally as in *L. ceratophylli*, and the ventral antennæ were somewhat more prominent. We were unable to see any horny processes, and the foot was certainly not forked, as that of *L. granulatus* is said to be. Hudson and Gosse, however, seem to doubt the forking of the foot, and the description seems generally doubtful. It will be worth while looking for this species somewhat earlier next year, and examining it carefully.

(xxii) *Æcistes intermedius*. We have seen two varieties of this *Æcistes*—one which we take to be the form mentioned by Hudson and Gosse, the other probably new. The one has the ordinary brown tube of *L. ceratophylli*, with moderately long antennæ; the other has a white tube, which

looks a greyish-black by transmitted light. This second form has very short antennæ, and the dorsal gap is somewhat wider, the edges of the corona at the gap curving somewhat outwards. The distinction seems hardly enough to mark a new species.

ORDER II.—BDELLOIDA.

FAMILY PHILODINADÆ.

(xxiii) *Philodina roseola*. Botanical Gardens.

(xxiv) *P. citrina*. Botanical Gardens.

(xxv) *Rotifer vulgaris*. Common.

(xxvi) *R. tardus*. Botanical Gardens.

ORDER III.—PLOIMA (Il-loricata).

FAMILY ASPLANCHNADÆ.

(xxvii) *Asplanchna brightwellii*. This was first noticed at Brighton, in July 1890. It was very plentiful, and numerous males were found. It appears to occur from June to September, as the pool at Brighton constantly visited, did not yield a single specimen for nine months of the year. Heidelberg yielded none, except in September 1891, when they were extremely numerous. Dr. Hudson remarks that his experience is, that the Asplanchnadæ do not occur in the same spot year after year—"The Rotifera," Vol. I, p. 26). But for two years *A. brightwellii* has been found in the same spot at Brighton.

(xxviii) *Asplanchnopus myrmeleo*. Found in all open pools tried, and at all times of the year, though numerous only on one occasion at Brighton.

FAMILY SYNCHÆTADÆ.

(xxix) *Synchaeta pectinata*. Brighton and Heidelberg.

(xxx) *S. tremula*. Botanical Gardens.

FAMILY TRIARTHRADE.

(xxxi) *Polyarthra platyptera*. Brighton.(xxxii) *Triarthra longiseta*. Brighton.

FAMILY HYDATINADE.

(xxxiii) *Hydatina senta*. Common. Plentiful on but one occasion, when hundreds were dipped with a small phial from a puddle not two feet in diameter in Hanna Street, South Melbourne. These furnished an interesting instance of rapid multiplication, as a half inch specimen tube set aside with some of the water, and containing a dozen or so of the rotifers, was seen after a few days to be almost as closely packed with the rotifers, as it had previously been with *Euglenæ*, which had coloured the water a bright green, and formed the food of *H. senta*.

FAMILY NOTOMMATADE.

(xxxiv) *Notommata aurita*. Botanical Gardens and Oakleigh.

(xxxv) *N. ansata*. Botanical Gardens.

(xxxvi) *N. naïas*. [Brighton yielded a considerable number of what is probably this species. They possessed the two smaller eye specks on the front of the corona, figured by Eckstein, and mentioned by Hudson and Gosse in a foot-note ("The Rotifera," Vol. II, p. 25), but the "tentacular brushes of setæ" were not seen. A reference to Eckstein's figure showed a general agreement between it and the specimens found.—J. S.]

(xxxvii) *Copeus ehrenbergii*. Botanical Gardens. When first found, the specimens were entangled among confervoid filaments, and for some hours did not reveal the "great lateral telegraph-like arms," which only appeared when the animal was in open water, in a watch glass, or deep cell. A good view was obtained of the vibratile tags, which were large, and extended like a fan, the width across

the outer edge being equal to the length. The cilia presented a very interesting appearance, rhythmical waves passing longitudinally downwards like the waves across a field of corn.

SUB-ORDER LORICATA.

FAMILY RATTULIDÆ.

(xxxviii) *Mastigocerca carinata*. Botanical Gardens, Sandringham. The dorsal ridge was less developed in the majority of the specimens taken, but in all other points, the agreement was so close as to negative the idea of a new species.

FAMILY DINOCHARIDÆ.

(xxxix) *Dinocharis tetractis*. Botanical Gardens.

(xl) *Stephanops muticus*. Toorak, Botanical Gardens.

FAMILY SALPINADÆ.

(xli) *Diaschiza semiaperta*. Brighton.

(xlii) *Salpina brevispina*. Toorak, Botanical Gardens.

FAMILY EUCHLANIDÆ.

(xliii) *Euchlanis dilatata*. Common.

FAMILY CATHYPNADÆ.

(xliv) *Cathypna* (n. sp.) Brighton. [This form so much resembled *C. luna*, that it is with some hesitation regarded as new. The points of difference from *C. luna* are—in the lorica being broader anteriorly, and the dorsal occipital edge more deeply excavated; the posterior possessing more of a

lobed character, having a decided inward curve on either side, and a rounded termination overhanging the toes, the most marked departure being the setting of the claws which, instead of tapering off from the shoulder to the end, are recessed so as to form a reversed barb; the surface of the lorica was also stippled. Length about $\frac{1}{130}$ th in.—J. S.]

(xlv) *Distyla ichthyoura* (n. sp.) Brighton. [The most distinctive character in this form, is the fish-tailed appendage to the posterior end of the lorica, which extends over half the length of two rod-shaped toes, each toe possessing a one-shouldered tapering claw. Anteriorly, the lorica has a dorsal crescentric excavation, forming two somewhat long lateral points. The lorica is finely stippled. The head is a truncated cone. There is a conspicuous eye. The trophi, as far as observed, resemble those of *C. luna*. Length $\frac{1}{125}$ th in., breadth $\frac{1}{80}$ th in. *Sp. ch.*—Lorica fish-tailed, stippled, crescentrically excavate in front, with somewhat long lateral points.—J. S.]

(xlvi) *Monostyla quadridentata*. Common.

FAMILY COLURIDÆ.

(xlvii) *Colurus bicuspidatus* (?). Brighton. [The specimens obtained closely resemble in most points the species doubtfully written, but differ in possessing two eyes very closely set, and two toes. Length $\frac{1}{220}$ th in., depth $\frac{1}{450}$ th in. Length of foot $\frac{1}{300}$ th in.—J. S.]

(xlviii) *Metopidia solidus*. Brighton.

(xlix) *Metopidia ovalis* (n. sp.) Brighton. [The form figured is beautifully transparent, and shows the internal organs well. An egg-shaped lorica, broader posteriorly in its dorsal aspect, possesses a slight excavation at either end, the posterior one being at the summit of a slight projection formed by the lorica curving outwards laterally. The ventral plate has deep anterior and posterior openings of the form of a half ellipse. Two eyes are set wide apart, each at the base of a slight process set at each side of the corona. The toes and foot much resemble those of *M. solidus*, as do the general arrangement of the internal organs. Length $\frac{1}{200}$ th in., breadth $\frac{1}{450}$ th in.—J. S.]

FAMILY PTERODINADÆ.

(l) *Pterodina intermedia*. Brighton. Of this species only one specimen was seen, but the "semi-circular projection" at the anterior was distinctly visible. It is interesting to find here this species, which was first noted by my colleague as occurring among Indian rotifers (*Jour. Asiatic Soc.*, Bengal, Vol. LVII, Part II, No. 4, 1889).—J. S.]

(li) *Pterodina trilobata* (n. sp.) Sandringham. This specimen differs from any described species in the form of the dorsal plate of the lorica, it having the semicircular projection in front, with two broad bulgings on either side, giving it a tri-lobed appearance. The lorica is stippled, and so far as observed, inflexible. The coronal discs are widely separate, and there is a notch at the base of each disc, giving the median portion the form of a short broad lip. The gastric glands, so conspicuous in the genus, escaped observation, probably owing to the stippling of the lorica. Length of lorica $\frac{1}{250}$ th in., extended $\frac{1}{140}$ th in., breadth $\frac{1}{200}$ th in.—J. S.]

FAMILY BRACHIONADÆ.

(lii) *Brachionus rubens*. Common.

(liii) *B. bakeri*. Common.

(liv) *Noteus quadricornis*. Brighton.

FAMILY ANUREADÆ.

(lv) *Anurea curvicornis*. Botanical Gardens.*

(lvi) *A. aculeata*. Common. Some three or four other species of Anureadæ have been partially worked, but not sufficiently to include them as determined species.

* The habitat Botanical Gardens refers in all instances to the Botanical Gardens, Melbourne.

DESCRIPTION OF PLATES.

PLATES XII AND XIII.

FIG. 1.—*Floscularia evansonii*, n. sp. $\times 200$.

FIG. 2.—*Lacinularia reticulata*, n. sp. $\times 120$. Left-hand figure partially contracted to show both antennæ.

FIG. 2A.—The same, viewed dorsally, $\times 200$.

FIG. 3.—*Æcistes wilsonii*, n. sp. $\times 200$.

FIG. 3A.—The same, showing fold back of the body over the foot in the contracted state, $\times 75$.

FIG. 3B.—The same, showing appearance of corona and antenna viewed from the side, $\times 75$.

FIG. 4.—*Cathypna*, n. sp. $\times 290$. Viewed dorsally.

FIG. 5.—*Distyla ichthyoura*, n. sp. $\times 375$. Dorsal aspect. Owing to failure of material, the internal structure was not fully made out, but distinctive specific characters are shown.

FIG. 6.—*Metopidia ovalis*, n. sp. $\times 525$. Ventral aspect.

FIG. 6A.—Anterior of same, viewed dorsally, $\times 500$.

FIG. 7.—*Pterodina trilobata*, n. sp. $\times 315$. Dorsal view.
